# *EPA Region 7 TMDL Review*

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|---|---|---|---|
| *TMDL ID* | 324 | *Water Body ID* | Kanapolis Lake, Smoky Hill River segments 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18 |
| *Water Body Name* | Kanapolis Lake Watershed | | |
| *Pollutant* | Chloride | | |
| *Tributary* | Tributaries attached to decision document | | |
| *State* | KS | *HUC* | 10260006, 10260007 |
| *Basin* | Smoky Hill/Saline | | |
| *Submittal Date* | 07/09/2004 | | |
| *Approved* | yes | | |

**Submittal Letter**

*State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.*

Kansas submittal letter received by EPA on July 9, 2004, formally submitting the TMDL document for approval; a revision to this TMDL was received September 29, 2004.

**Water Quality Standards Attainment**

*The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

The current water quality standard (WQS) for domestic water supply is set at 250mg/L chloride (K.A.R.28-16-28e(c)(3)(A). The loading capacity in this phased TMDL is set at the current numeric criterion of 250 mg/L. Provisional phase 2 targets have also been set at the average concentration for samples collected at flows less than the median rate, due to the fact the Smoky Hill River system is affected by the discharge of saline groundwater from the Dakota Aquifer. The elevated background of chloride makes achievement of the

criterion unlikely at lower flow conditions at stations 007, 269n and 723. However, these provisional targets will have to established in the future to reflect true background conditions, using the appropriate administrative and technical WQS procedures and processes. To ensure the domestic water supply is protected, the endpoint is to maintain average chloride concentrations below 250 mg/L in Kanapolis Lake.

Smoky Hill mainstem segments 5, 7, 8, and 9 have extra protection provided under the Kansas Water Quality Standards and the Kansas Antidegradation Policy. These segments are identified within the December, 15, 2003, Kansas Surface Water Register as Exceptional State Waters, with Special Aquatic Life Use designation. According to the Kansas Antidegradation Policy, if the receiving surface water is classified as an Exceptional State Water, the permit limits derived must provide protection to existing uses and existing water quality (Tier 2 ½ waters). Designated uses must be protected and maintained once a designated use is realized. Permit limits for discharges to Exceptional State Waters will typically require maintenance of existing water quality. Existing water quality may be lowered only if the Department determines that there is an important social or economic need to lower existing water quality, as demonstrated through the guidelines provided in EPA's guidance document "Interim Economic Guidance for Water Quality Standards, March 1995" (EPA-823-b-95-002). Given the distinction of these mainstem segments, future analysis of provisional targets in Phase 2 of this TMDL must rigorously account for all anthropogenic sources, including the salt mining industry, as well as naturally occurring sources of chlorides; further explanation is provided within the allocation section of this Decision Document for approval of this TMDL.

**Numeric Target(s)**

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

The water quality standards, beneficial uses and numeric criteria are described. The phase one target is the numeric criterion for chloride, 250 mg/L.

**Link Between Numeric Target(s) and Pollutant(s) of concern**

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.*

The numeric target is the numeric criterion and the link between the target and the chloride is direct.

**Source Analysis**

*Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.*

There are natural, high background concentrations of chloride due to the discharge of naturally saline groundwater from the Dakota aquifer into the alluvial aquifer of the Smoky Hill River and then into the river in Russell County. The saline groundwater originates from upward intrusion of saltwater from the Cedar Hills Sandstone of Permian age, which underlies the Dakota aquifer in parts of central and north-central Kansas.

There is a general decrease in flow due to conservation practices and groundwater consumption/irrigation. There have been substantial land and water use changes over time in the basin due to irrigation. There is a load of chloride coming from past oil field brine disposal which is small compared to the naturally sources, but is still a significant load. There are twenty-seven NPDES permitted facilities in the watershed; nineteen are non-discharging lagoons. All other potential sources are discussed.

**Allocation**

*Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.*

The allocation is expressed as a TMDL load duration curve in pounds per day of chloride, which is derived from the numeric criterion and the flow curve. The allocation is a function of the flow; phase one allocations and margins of safety are expressed at low flow (90% exceedence).

EPA notes there is no chloride limit in the NPDES permit issued to the Independent Salt Company, and no wasteload allocation calculations were performed when the permit was issued for this new discharge in May, 2003. An Antidegradation review was completed, but the Kansas Antidegradation Policy which states "Existing water quality may be lowered only if the Department determines that there is an important social or economic need to lower existing water quality, as demonstrated through the guidelines provided in EPA's guidance document "Interim Economic Guidance for Water Quality Standards, March 1995" (EPA-823-b-95-002)"; this is a privately owned industrial facility and there are no calculations in the review based upon EPA guidance.

EPA anticipates the reissuance of the Independent Salt Company permit (Federal permit No. KS0096857) will include a wasteload allocation and a permit limit for chloride that more accurately takes into account background conditions, using monitoring from Phase 1 to derive an end-of-pipe limit for subsequent permits based on natural background concentrations of chloride for Phase 2. This updated information will then be incorporated into Phase 2 of this TMDL as per 40 CFR 130.7(a) and 130.7(c)(1). EPA also anticipates Kansas will closely follow their Antidegradation Policy and EPA guidance when determining social and economic impact on the surrounding community in regards to meeting State Water Quality Standards Regulations.

**WLA Comment**

The total current WLA entering Wilson Lake is 4.16 tons/day, with an additional 1.12 tons/day allowable, while keeping the lake under 250 mg/L. Phase 1individual wasteload allocations for the following facilities are set in units of tons/day: Wakeeney - 0.18; Ellis - 0.31; Hays - 1.75; McKracken - 0.04; Russell - 1.46; Wilson - 0.06; Ellsworth - 0.31;

Independent Salt Company - 0.05.

WLAs are also provided for low flow conditions at the following monitoring stations in units of tons/day: station 007 - 2.28; station 723 - 0.37; station 269 - 0.37; accumulated Lake Inflow - 5.28, which represents all existing point sources above the lake plus the available future allocation. The WLA for the nineteen non-discharging NPDES facilities is zero.

**LA Comment**

Phase 1 low flow load allocations for the following monitoring stations are set in units of tons/day: Station 007 - 4.56; station 723 - 6.99, station 269 - 10.94.

**Margin of Safety**

*Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.*

The MOS is explicit and set at 10% of the calculated load allocations for Phase 1 low flow conditions for the following stations (tons/day): Station 007 - 0.51; station 723 - 0.78, station 269 - 1.22; accumulated lake inflow - 1.81, which represents 10% MOS from load allocations plus 0.59 tons/day MOS from the wasteloads.

**Seasonal Variation and Critical Conditions**

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

Seasonal variation is documented with the seasonal consistency of elevated chloride levels.

**Public Participation**

*Submital describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

Public meetings were held on January 7 and March 5, 2003 in Hays to discuss this particular TMDL and others in the Smoky Hill/Saline basin. An internet web site also housed information for the public to access. A public hearing, held in Hays, was conducted on June 2, 2003 to discuss the Smoky Hill/Saline basin TMDLs; the Smoky Hill/Saline Basin Advisory Committee met to discuss the TMDLs in the basin on October 3, 2002, and January 7, March 5, and June 2, 2003.

**Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).*

KDHE will continue to monitor at stations 269, 723, and 007. Further sampling and evaluation of Kanapolis Lake should occur twice before 2010. Sampling on the tributaries should occur twice within the 2005-2010 period. Monitoring of chloride levels in effluent will be a condition of NPDES and state permits for facilities.

**Reasonable assurance**

*Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.*

Reasonable assurance includes numerous authorities and funding through the Kansas Water Plan, and minimal control can be exerted on natural contributions to loading.